CLAIMS

1. An optical assembly adapted to observe a scene which provides an optical input to the assembly, a spatial light modulator (SLM), a controller controlling the display of the SLM, and a detector; the controller being adapted to modify a pattern displayed on the SLM so as to cause the SLM, in use, to control the radiation incident upon the SLM from the optical input so as to sequentially scan across the detector radiation from a plurality of different angular regions or depth regions in 3-D space of the scene or a surface region through the 3-D space that the optical assembly is observing.

2. An assembly according to claim 1 in which the controller is adapted to scan different angular portions of the scene (angularly disposed in azimuth and/or ascension relative to the optical axis of the assembly).

3. An assembly according to claim 1 or claim 2 in which the controller is adapted to focus different depth regions of 3-D scene space over the detector.

4. An assembly according to any preceding claim in which the pattern has a component composed of a substantially linear diffraction grating pattern and a component comprised of a substantially a chirp function.

5. An assembly according to any preceding claim in which angular portions are scanned by modifying the linear component of a combined linear function and chirp function.

6. An assembly according to any preceding claim in which different depth regions are focused by displaying patterns with different combined chirp functions.

7. An assembly according to any preceding claim in which the controller has a library of possible linear and/or quadratic or higher order functions and a selected combination of linear and quadratic or higher order functions from the library are, in use, applied to the SLM.

8. An assembly according to any preceding claim in which the detector comprises a line array of detector elements or a simple array of detector elements and the controller is adapted to control the display on the SLM to scan the scene image over the detector array in a direction generally transverse to the direction of the line array, or transverse to the elongate direction.

9. An assembly according to any preceding claim in which the radiation from the selected surface or region in 3-D space in the scene is focused onto the detector.

10. An assembly according to any preceding claim in which the pattern on the SLM is capable of being changed at least a thousand times a second.

11. An assembly according to any preceding claim in which points in 3-D space are sequentially in time directed, or focused, onto a detector, the SLM being programmed by the controller to direct, or focus, different points in space onto the detector at different times.

12. A method of directing a scene image onto a detector comprising using a programmed SLM to control the x-y part of the scene image that is directed onto the detector and/or the imaged plane of the scene in the z direction that is in focus, the scene-detector direction being in the z direction, in which the display on the SLM is programmably controlled so as to scan the scene image over the detector over time, with the controller taking time-spaced records of what the detector detects.

13. A method according to claim 11 or claim 12 in which a chirp is applied to the SLM.

14. A method according to claim 11 or claim 12 in which a linear grating is applied to the SLM.

15. A method according to anyone of claims 11 to 14 in which the orientation of a linear grating and/or the spacing of the lines of the grating are controlled so as to control the location of the region of the scene that is directed onto the detector.

16. A method according to claim 13 or any claim dependent directly or indirectly on claim 16 in which the chirp is used to determine the distance from the detector of the plane in 3-D space in the scene that is focused to the detector.

17. A method according to any one of claims 12 to 16 in which the programmed SLM compensates for aberration in an optical system.